Amendment to the Claims

This listing of claims will replace all prior versions, and listing, of claims in the application.

Please amend the claims as follows:

Claim 1 (previously presented): An isolated, synthetic or recombinant nucleic acid comprising (a) a consecutive sequence having at least 95% sequence identity to the sequence of SEQ ID NO:1 and encoding a polypeptide having polymerase activity, or (b) sequences fully complementary to the full length of (a).

Claim 2 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 28, wherein the polymerase activity is retained at the temperature for four or more hours.

Claim 3 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, comprising the sequence as set forth in SEQ ID NO:1, or, sequences fully complementary to the full length thereof.

Claims 4-6: canceled

Claim 7 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the sequence identity is determined by analysis with a sequence comparison algorithm.

Claim 8 (canceled)

Claim 9 (previously presented): An isolated, synthetic or recombinant nucleic acid comprising (a) a sequence that encodes a polypeptide having polymerase activity having at least

97% sequence identity to SEQ ID NO:1 or (b) a sequence fully complementary to the full length of the sequence of (a).

Claim 10 (previously presented): An isolated, synthetic or recombinant nucleic acid comprising (a) a sequence that encodes a polypeptide having polymerase activity having at least 99% sequence identity to SEQ ID NO:1, or, (b) a sequence fully complementary to the full length of the sequence of (a).

Claim 11 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 7, wherein the sequence comparison algorithm is FASTA version 3.0t78 with the default parameters.

Claim 12 (previously presented): An isolated, synthetic or recombinant nucleic acid comprising (a) a sequence that encodes a polypeptide having polymerase activity, wherein the polymerase-encoding sequence comprises SEQ ID NO:1, or a sequence encoding enzymatically active fragments of SEQ ID NO:2; or, (b) a sequence fully complementary to the full length of the nucleic acid sequence (a).

Claims 13 to 15 (canceled)

Claim 16 (previously presented): An isolated, synthetic or recombinant nucleic acid encoding (a) a polypeptide having polymerase activity and the sequence as set forth in SEQ ID NO:2, or (b) enzymatically active fragments of (a).

Claims 17 to 27 (canceled)

Claim 28 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polypeptide has polymerase activity at a temperature in a range from about 90°C to 113°C.

Claim 29 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polypeptide has polymerase activity at a temperature up to 150°C.

Claim 30 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polymerase activity comprises DNA polymerase activity.

Claim 31 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polymerase activity comprises 3'-5' exonuclease activity.

Claim 32 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polymerase lacks a 3'-5' exonuclease activity.

Claim 33 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the polypeptide has polymerase activity in salinity conditions from 5 mM to 200 mM salt.

Claim 34 (withdrawn): A method for amplifying a nucleic acid comprising using a polymerase as set forth in claim 1.

Claim 35 (withdrawn): The method of claim 34, wherein the amplification reaction is a polymerase chain reaction (PCR).

Claim 36 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 1, wherein the nucleic acid further comprises an expression vector.

Claim 37 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 36, wherein the expression vector comprises a viral particle, a baculovirus, a phage, a plasmid, a cosmid, a fosmid, a bacterial artificial chromosome, a viral DNA or a P1-based artificial chromosome.

Claim 38 (withdrawn): A method for identifying functional polymerases comprising:

modifying the sequence of a polypeptide encoded by a nucleic acid as set forth in claim 1 and testing the DNA polymerase activity of the modified polypeptide in a PCR amplification at extreme high temperature for four or more hours and under conditions that allow said polypeptide or fragment or variant to function, and

detecting formation of an amplification product, wherein formation of the amplification product identifies a functional DNA polymerase.

Claim 39 (previously presented): A method for making a polypeptide comprising:

(a) providing a nucleic acid having a sequence set forth in claim 1 or claim 12; and

(b) expressing the sequence, thereby expressing the polypeptide.

Claim 40 (previously presented): The method of claim 39, wherein the nucleic acid further comprises an expression vector.

Claim 41 (previously presented): The method of claim 39, further comprising inserting the nucleic acid into a host cell and expressing the sequence in the host cell.

Claim 42 (previously presented): The method of claim 41, wherein the host cell is a prokaryotic or a eukaryotic cell.

Claim 43 (previously presented): The method of claim 41, wherein the host cell is a yeast cell, a bacterial cell, a mammalian cell, a fungal cell, an insect cell or a plant cell.

Claim 44 - 45 (canceled)

Claim 46 (previously presented): An isolated, synthetic or recombinant nucleic acid comprising (a) a sequence having at least 95% sequence identity to SEQ ID NO:1 and encoding a polypeptide having polymerase activity, wherein the polypeptide has the sequence as set forth in SEQ ID NO: 2, and at least one conservative amino acid residue substitution, or (b) a sequence fully complementary to the full length of (a),

wherein the conservative amino acid residue substitution comprises substitution of one amino acid for another of the same class.

Claim 47 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 46, wherein the at least one conservative amino acid residue substitution comprises substitution of one hydrophobic amino acid for another, or substitution of one polar amino acid for another.

Claim 48 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 47, wherein the at least one conservative hydrophobic amino acid residue substitution comprises substitution of at least one isoleucine, valine, leucine or methionine, for another.

Claim 49 (previously presented): The isolated, synthetic or recombinant nucleic acid of claim 47, wherein the at least one polar amino acid residue substitution comprises substitution of arginine for lysine, glutamic acid for aspartic acid, or glutamine for asparagine.

Claim 50 (canceled)

Claim 51 (previously presented): An isolated, synthetic or recombinant nucleic acid that encodes a polymerase, wherein the polymerase comprises (a) a sequence having at least 95% sequence identity to SEQ ID NO:2, or (b) a sequence fully complementary to the full length of (a).

Claim 52 (previously presented): An isolated, synthetic or recombinant nucleic acid that encodes a polymerase, wherein the polymerase comprises (a) a sequence that is a variant of SEQ ID NO:2, and the variant polymerase sequence has at least 97% sequence identity to SEQ ID NO:2, or (b) a sequence fully complementary to the full length of (a).

Claims 53-55 (canceled)